GRAZING RECONNAISSANCE

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GRAZING RECONNAISSANCE

Object

Much has been done since the beginning of grazing administration on National Forests in the way of perfecting maps and accumulating information relative to the grazing resources. In this work, as in other problems, however, there is a point beyond which progress is slow if dependent upon rough approximation in revising maps and upon chance collection of detailed information. That this point has been reached, and that future progress necessitates systematic study of the grazing resources, is the opinion of the men who are actually charged with the management of grazing on National Forest lands.

To appreciate the nature and degree of accuracy of the data which should be collected by such study, it is necessary to keep in mind at least the major problems which come up for solution in the administration of grazing on any forest and the factors upon which the solution or decision should be based. From the standpoint of the range the first main points for decision are:

1. The class of stock to which each unit of range or area of range is best adapted, all factors considered.

2. The period during which each unit may be grazed without injury to the range or to the Forest or watershed

3. The number of stock each unit will carry for the period during which it should be grazed, without injury to the range, the forest, or watershed, and at the same time without unnecessary loss of forage through nonuse.

After these points have been decided, a second set of question arise relative to the details of (a) how the time of grazing each camp can be varied so that the vegetation on each portion of the range will be given a chance to grow to seed maturity every few years; and (b) how the stock should be handled so as to eliminate unnecessary waste by trampling or overgrazing one portion and undergrazing another.

Hand in hand with progress on the above phases there is need for corresponding progress in development of water facilities, eradication of poisonous plants, fencing or posting of poison areas, construction of trails to open up new range or for better utilization of old range, construction of drift and division fences, and other minor improvements.

The class of stock to which a given unit of range is best adapted depends upon:

(a) The species of plants forming the bulk of the vegetation available for stock.

(b) Topography and altitude.

(c) Water facilities for stock.

(d) Species of timber, condition of reproduction, and the need of securing reproduction in the shortest possible time.

(e) The necessity for watershed protection, either to avoid pollution of water supply or to avoid erosion and floods.

(f) Local conditions of the stock industry affecting use of the range.

The period during which each unit of range should be grazed should be based upon:

(a) Species of plants which make up the forage crop.

(b) Main period of vegetative growth and seed maturity.

(c) Water for stock; period available; abundance.

(d) The relation of the specific unit of range to other units of range involving proper balance between spring, summer, and fall range, and the best combination of park and timber range to meet requirements in handling stock.

In deciding the number of stock any unit of range will properly carry, many factors enter:

(a) Species and density of vegetation palatable to stock and so located that stock will use it.

(b) Amount and distribution of moisture during the growing season.

(c) Soil fertility.

(d) Crop of forage produced in average years.

(e) Need for improving the range by allowing the vegetation to go to seed.

(f) Need of watershed protection.

(g) Distribution and abundance of water for stock.

(h) Steepness of slope and liability to any form of erosion.

To utilize a range most economically by the stock put upon it involves a proper balance--which varies somewhat with class of stock, topography and character of individual ranges--between untimbered and timbered range, spring, early

summer, midsummer, late summer, and fall range; and the adjustment of range with relation to watering places so that water will be most evenly distributed for all allotments.

Whether range management, as outlined in the preceding pages, is brought about by cutting and fitting, adjusting and readjusting, without any systematic inventory of the grazing resources, or by making systematic examination of the ranges as the basis of the grazing plan, field study is necessary.

If the data collected are to be of the greatest permanent value, they must be represented on maps and in concise notes and estimates, which represent the actual field conditions reduced to a scale which will enable the admininstrator to comprehend the relation of the resources on each acre of a forest to those of adjoining acres, to the forest as a whole, and to grazing management. Further, the map representation should be according to a uniform standard of classification, so far as praccicable, so that an administrative officer taking charge of a forest can at once advance the plan of management and improvement from where his predecessor left it, without digesting voluminous reports or doing an unnecessary amount of field work to fix in mind the interrelation of the various units and resources under his direction.

The most feasible way of securing the desired data, especially since a fairly accurate map classification is so

important, is to make a systematic examination of the range by such units as will best facilitate the correct location and acreage of each type area, drainage, cultural features, etc., on the map. For want of a better term, such systematic examination and study of range has been designated Range Reconnaissance.

Method of Work

Survey

The work of mapping and taking notes should be done by men working individually. In surveyed country, section lines should be used as base lines, and pacing and direction should be checked by reference to section corners and quarter corners. In unsurveyed territory, the mapping should be done, preferably from base lines consisting of parallel lines in a cardinal direction, projected from an established public survey. In very rugged country where it would be difficult to locate the above parallel lines, accurately surveyed traverse lines up main canyons may be used.

In any case the base lines run out from a known point by the examiner should be accurately chained, and should be marked by permanent points well established and referenced in order that they may be checked later, if necessary, and so that when the area is covered by a public survey ties can be made and the public survey properly represented on the map. For each

base line or traverse, accurate notes should be kept showing beginning point, courses and distances, location of important topographic, cultural, and type features along the line, altitudes of ridges and draws, description of permanent points established, and error in distance and direction if check ties are made.

The examiner should keep in mind the purpose of the survey and cross his territory a sufficient number of times to make his results reliable. In all cases he should start from a known point, cross his territory in a known direction by the aid of a compass, pace his distances, and check distance and direction whenever possible by ties to established lines and points. On timbered areas each section should be crossed twice on the forty lines, except on areas where a reliable topographic map has already been made and where the range is uniform in type and of little or no value for grazing. Such a combination is occasionally met with in lodgepole timber, and to cross each section once may be sufficient. On untimbered lands, where the topographic map is already made, to cross the section once on the quarter line may be sufficient. The judgment of the examiner must decide in each case. In all cases where the topographic map is being made by the grazing crew, each section should be crossed twice and occasionally additional checks may be necessary.

Mapping in Field

The examiner should cross each section, as indicated under survey, and make a map on Form 764, scale 4 inches to the mile, showing the following data:

Grazing Types.--The section should be classified and mapped into types and subtypes in accordance with the outline given under types and legend. Important areas such as parks in dense timber, clumps of timber in parks, and other similar type changes which are important landmarks, should be mapped down to 5 acres in size. Unless some marked contrast of this character exists, a change in type of less than 10 acres should not be mapped.

Topography.--On areas where a reliable map has already been made by the Geological Survey, by timber reconnaissance crews, or land classification crews, the topography for the grazing maps may be copied from such topographic map. In using the data, however, drainage and main peaks and ridges should be checked for location. Such check will pick up any important errors in the existing map.

On areas for which no reliable topographic map has been made, the grazing reconnaissance crew should make a contour map using 100-foot intervals. Where rock ledges less than 100 feet high fall between two contours and represent a condition of inaccessibility which is not shown by the contours, the rock ledge should be shown by a line and hachures, supplementing the contours.

Experience in the past has shown that to prepare a reliable topographic map from aneroid readings, occasional absolute elevations are almost a necessity for checking aneroids and adjusting contour numbers. With the absolute elevation determined for a number of points judiciously chosen throughout the forest, the relative altitude of widely separated portions of the forest will be correctly shown on the map. Also the contour points determined by aneroid elevations carried up or down from the points of known absolute elevation can not go far wrong in their relative position as regards altitude. When an examiner establishes a contour point along his line of examination, he should, before leaving that point, sketch the contour line as far on either side of the line as his eye can trace it with any definiteness, for the reason that the point of intersection of that contour with his next line through the section may be in dense timber which shuts out a view of the country between the lines of examination.

In planning the complete reconnaissance of a forest, such a control of topography by establishing absolute elevations throughout the forest should be worked out. If bench marks have been established by the Geological Survey or other surveys, they should be used. If no such points exist, with absolute elevations established, at least one main level line should be run across the forest and permanent bench marks established. From points along this line as a base, fly lines

may be run out as needed to secure efficient control. For such work a standard surveyor's level and level rod reading to 0.001 foot should be used. To facilitate location and description of bench marks established, without running a transit or compass line, the level line or lines should be run along main trails or ridges so far as practicable, with side lines from these, where necessary, to determine elevation of prominent features.

The extent of such level lines advisable will depend upon the topography of the forest in question and the degree of accuracy necessary to make the topographic map fill the purposes for which it is intended. For grazing purposes a general control is all that is necessary. If the topographic map is to meet the needs of Silviculture in future, greater accuracy may be necessary. The matter should be settled for each Forest by the District Forester in conference with his assistant District Foresters in Grazing, Silviculture, Lands, and Operation, and the man who will be in charge of the field work, before the field work is started.

Drainage.--All drainage should be shown on the map as indicated under legend. Special attention should be given to the mapping of water facilities for stock as they are a controlling factor in range management.

Culture.--Buildings, fences, corrals, roads, trails, telephone lines, etc., should be accurately located. Before the field work is undertaken the man in charge of the work

should secure from the Supervisor's office the best available data as to the extent and location of such cultural features. These data should be carefully checked in the course of the field work. In case a location, as shown by the Supervisor's records, appears to be incorrect, a careful check should be made from an established corner or base line, and the check recorded to justify the change when final maps are compiled.

Alienated Lands.--Before undertaking the field work the man in charge of the party should secure from the Supervisor's office or District office a map showing up-to-date status of alienated lands. Time need not be spent to accurately check the boundaries of such lands in the field as it is assumed that the survey of such lands is correct. The examiner should, however, check from his line to some corner of the private holding. Fences and other improvements on such lands should be sketched in. If the area is unfenced and comparatively small, it should be gone over and classified as though forest land, for the reason that such procedure will require no more time in the long run than not to cover it and will give a complete topographic and type map.

General.--To carry a set of crayons and properly color the field map in the field is inconvenient. For this reason, the grazing types are numbered and the types should be indicated on the field map by the corresponding number.

For convenience, the types and corresponding numbers are printed on the field sheet Form 764. Special notation, other than that included under legend, necessary on any forest should be made up by the man in charge of the party. Each examiner should be given a copy and it should be adhered to. Special notation used on a field map for any section should be recorded under the printed heading, "Special Notation," Form 764.

Field Notes

In addition to making the field map on Form 764, the examiner should make notes on points which can not well be shown on the map. The notes should include the following:

1. Name of Examiner, Sec., T., R., Date.

2. Surface: Flat, rolling, rugged, direction of slope; canyons deep or shallow; easily accessible; accessible with difficulty, or inaccessible; rock exposures, slide rock, boulders, cliffs.

3. Soil; Rock formation, character of soil; depth, moisture (dry, moist, wet), humus.

4. Brief description of forest growth on each grazing type, including:

   a. Species, age, density--scattering, open, medium, or dense.

   b. Reproduction; density, age, injury by grazing.

5. Description of herbaceous and shrub vegetation.

   a. Surface covered: The portion of the total ground surface from which herbaceous or shrub vegetation is not excluded by tree growth (due to shade, competition for plant food, etc.), rock outcrops, small intermittent lakes. Surface

covered should be expressed in terms of 10, 10/10 indicating that herbaceous or shrub vegetation is distributed over the entire surface.

b. Average density: The proportion of the ground (within the surface boundaries where herbaceous or shrubby vegetation is growing) which is actually covered by herbaceous or shrubby vegetation. Density, like surface cover, should be expressed in terms of 10, 10/10 indicating that on the surface over which herbaceous and shrubby vegetation is distributed, the vegetation completely covers the ground.

c. Percentage of existing vegetation, which is of value for forage, and percentage which is nonpalatable or worthless as forage.

d. Kind of vegetation: Grasses, total per cent; weeds, total per cent; browse, total per cent.

e. Important species of grasses and percentage of each species.

f. Important species of weeds and percentage of each species.

g. Important species of browse and percentage of each species.

Under e, f, and g, prominent worthless species as well as valuable species should be listed.

6. Poisonous Plants.--Species, location by types, abundance, known losses of stock.

7. Watering Places.--Character (stream, lake, spring, tank, well, etc.), location, permanent or intermittent, nearest permanent water, number of stock available water will suppoy, recommended improvement or development.

8. Range-destroying animals.--Prairie dogs, gophers, squirrels, etc.; location by type, acreage damaged.

9. Examiner's comment:

a. Proper season of grazing begins

b. Range best adapted to C.H.S.G.--Reasons

c. Carrying capacity; high, low, medium, for this type--Reasons.

d. Is range fully and properly utilized?

e. Overgrazed areas; type, location, cause.

f. Any other points which should be made known.

Of the above headings all except (a) and (b) are self-explanatory. On a single grazing type on timbered range the amount of ground surface upon which herbaceous and shrubby vegetation will not grow may vary from a negligible area to almost the entire surface. For example, take a medium dense stand of juniper where the bare space around the trees amounts to 5/10 of the total ground surface. Suppose the reamining 5/10 of the ground surface exposed to sunlight supports a perfect sod, 10/10 density of grama grass. It is obvious that to say there is a 10/10 density ground cover of grama grass, without any reference to the 50 per cent of bare surface, would be misleading in determining the amount of forage. Likewise, to say that the average density of vegetation is 5/10 would be misleading to any one checking the description, and from the standpoint of management would require explanation to show that the area is not overgrazed, in as much as grama grass ordinarily forms more than 5/10 density stand. Since the final object is (a) to get at the actual amount of forage; (b) to picture the conditions as they exist, the most feasible way of describing the case cited is as follows: 5/10 of complete ground surface occupied by tree growth: remaining 5/10 supports a 10/10 density ground cover of grama grass.

The expression of both, surface occupied and density in terms of ten, makes it easy to compare the amount of forage on one area with that on another or to reduce the forage on a given acreage to an equivalent number of acres having full ground cover. By multiplying the numerators and moving the decimal point one figure to the left gives the equivalent in acreage having complete ground cover.

Whether a section is crossed once, twice, or more times, the notes should be made for each type and not by forties. For recording notes Form 764 A should be used. This Form is provided with printed headings for all points outlined under notes above.

Filing

The field notes of each section should be attached to the field map, Form 764, for the same section, and the whole filed in 5 x 8½ manila envelope, marked with proper numbers for section, township, and range.

Before the field map on Form 764 for any section is transferred to Form 765 it should be compared with the maps for the four adjoining sections to see that, contours, streams, roads, trails, telephone lines, grazing types and subtypes "jibe." This work should be done as far as practicable at the close of the day's filed work. At any rate it should be done before the crew leave the camp from which the area is accessible. In case men responsible for adjoining sections can not

agree on some point the discrepancy should be referred to the chief of party, and where, in his judgment, it is necessary, in order to maintain the general efficiency of the work, he personally should settle the question by a field examination. This comparison of maps for all adjoining sections is imperative and each chief of party will be held responsible for seeing that it is properly done.

Transfer of Data to Map Sheet, Form 765

The rough field map should be transferred to the section plat sheet, Form 765. The map should be properly colored with crayon colors; sufficient contours should be numbered to enable any one inspecting the map to readily determine the altitude of any one portion of the section; type numbers should be written on each type; any special notation used should be explained under the map so that the sheet will be self-interpreting.

A concise description, made up from the field notes of the section, should be written legibly in ink on Form 765, as indicated by the printed headings which correspond very closely to the headings on the field note sheet, Form 764 A.

The preparation of map and notes on Form 765 should be done at camp, so far as possible, on rainy days, but it should not be allowed to accumulate until any area is no longer fresh in the examiner's mind.

Plant Identification

The work of collecting plants and notes on distribution, forage value, and growth habits should go hand in hand with reconnaissance. The intensity of the data which can and should be collected will depend upon the qualifications of the men doing the work.

If the reconnaissance is carried on by men trained along botanical lines, the aim should be to have a collection in triplicate of all herbaceous and shrub vegetation growing on the forest by the time the reconnaissance is completed for the forest. One set should be mounted and filed in the Supervisor's office, one set in the District office, and the third sent to the Washington office for identification.

Where the work is being done by members of the local forest force, at least the grasses, weeds, and shrubs, which are important in making up the forage crop of the forest, should be collected in triplicate.

For every specimen collected notes should be kept during the field work relative to (1) distribution; (2) abundance; (3) seasons of growth; (4) time of flowering and seeding; (5) amount and character of foliage; (6) value as forage compared with other species, as determined from observations regarding the preference of different classes of stock in using the range.

In writing the forage notes on each section, well-known local common names should be used in listing vegetation.

Where no common name is known for a plant which has any prominence, the chief of party should decide upon one which is as suggestive as possible for the plant in question, and then insist that it be adhered to by all members of the party. Care should be taken to see that common names thus chosen, as well as all others, are recorded in the plant catalogue and on plant specimen folders for the plants to which the names refer, in order that the corresponding scientific name can be filled in. So far as it can be done reliably each field man should fill in the scientific name for plants when he prepares his Forms 765. This will aid in avoiding discrepancy through use of the same common name for different species.

When the field data are finally compiled, the notes for each species should be placed on individual cards and filed in the card record as provided in the plan and instructions for handling forage plant specimens, adopted for the Service as a whole in 1912.

For suggestions in collecting, drying, etc., the leaflet, "Suggestions for the Collection of Range Plant Specimens on National Forests," issued May 6, 1911, should be followed.

Types and Legend

General

In deciding upon a system of types satisfactory for classifying the ranges throughout the National Forests, two objects have been kept in view:

1. To have the color map show at a glance as nearly as possible the general picture of the total vegetation as it would appear to the administrator in the field. In other words, to reduce the general field appearance to a scale which will enable comprehension of the whole forest at once, and consequently comprehension of the interrelation of the more general classes of land throughout the forest or any part of it.

2. To show, in addition to the general picture, as much detail regarding (a) the kind of forage on each acre; (b) the density of the actual forage stand; (c) the condition of the range, as is consistent with efficiency of interpretation.

The general picture idea is accomplished by classifying all the lands into ten main types, each represented by a distinct color. The colors are chosen with a view to contrast and consequently ease of interpretation.

The more detailed information outlined under "2" can be shown only by a system of subtypes. There are too many to permit of a color scheme or a scheme of hatching without confusion.

For example of the use of type and subtype, and the need for both, take the following:

In lodgepole timber there frequently occur,--

a. Areas where the undergrowth is 50 per cent pine grass, 25 per cent palatable weeds and shrubs, and 25 per cent nonpalatable weeds and shrubs.

b. There also occur areas where the undergrowth is small huckleberry, 85 per cent, and scattering weeds and grass, 15 per cent.

c. Further, there are areas where the under g rowth is clover, palatable grasses and shrubs.

The general appearance of the area is the same in each case, but the range value is decidedly different, the combination under "a" being of low value, "b" practically worthless, and "c" excellent range, if accessible. Corresponding variations occur throughout the National Forest lands. To meet the difficulty, the general type is represented by a color and the subtype by letter designations over the type color.

In using letters to designate grazing subtype no attempt should be made to show more than the very important forage characteristics of the type. In some cases, for example, grasses, weeds, and browse, about equal in amount with no decidedly predominating species, make up the subtype. The only way to show the forage combination in such cases is by the designation, "Gr.-Wd.-Br." The vegetation on another area of the same main type may be made up of pine grass, clover, and large huckleberry in equal amounts, with very minor amounts of anything else. In such case the designation "Pg.-Cl.-Hb." should be used.

In any case no more than three combinations of letters should be used to represent grazing data. In addition Alpha numeric symbols should be used to represent timber

species. Under legend the letter designations thus far adopted are included, and they should be used on all forests to represent the species or combination for which they stand. In case new designations are necessary on any forest, the chief of party should decide upon the ones to be used, and then insist that each examiner adhere to their use.

Types

Type No. 1 -- Open grass land other than meadow and secondary meadow

Crayon No.

2 This general type includes bunch grass areas, grama grass areas, and other open grasslands, not meadow in character, where grasses predominate. Weeds or browse, or both, frequently occur in mixtures with the grasses, but the type color should be adhered to unless the area is more typically a weed or browse range.

2
GA-Wd-Br

The mixture of grasses, weeds, and browse can be taken care of by the subtype as follows:

Other subtypes should be decided upon in accordance with instructions under Types and Legend, General, and "Subtype designations."

Type No. 2 -- Meadows

This general type includes the wet meadow land where water grasses (sedges) are predominant, and the moist areas meadow-like in character, which occur usually as open parks in timber. The latter class are usually moist during early summer but become moderately dry by midsummer, and as a consequence the predominating grasses are true grasses rather than sedges.

Crayon No.

62 The wet meadow should be represented as:

62 The dry or secondary meadow as:

46 <u>Type No. 3 -- Weeds</u>

This general type includes all untimbered areas where "weeds" are the predominant forage. It does not include small weed areas in conifer timber and does not include weed areas in broad-leaf timber as it has been found unsatisfactory to include aspen weed under the weed color. The untimbered weed range usually does support grasses and browse in addition to the weeds. These can be taken care of by the subtype designations.

87 <u>Type No. 4 --Sagebrush</u>

This type includes all lands where sage brush predominates. While sage brush is in most cases browse, the sage brush lands are usually of different range value and different in season of grazing from the areas which are listed under browse above. They are of sufficiently distinct character to justify a color designation.

Crayon No.

15 Type No. 5 -- Browse

This type includes all lands, outside of conifer timber, where browse, except sagegrush, is the predominant forage. As in the other types, subtypes under browse may be indicated by letter designations.

69 Type No. 6. Range in conifer timber supporting grasses, weeds, browse, either singly or in combinations

This type includes all range in conifer timber, except as provided under Type 9. The forage may vary from a pure stand of pine grass to a pure stand of weeds or browse. It usually, however, is made up of grasses, weeds, and browse, and the proportion of each varies so widely that it is not thought advisable to attempt a division into types with distinct colors. These variations can best be represented by subtypes as discussed under "Types and Legend," "General."

Type No. 7

29 This type includes all areas, in timber and brush, which have no value for grazing. It also includes other waste areas not strictly in timber or brush and not barren which are so rough as to make their future use entirely improbable

Crayon No.

Such areas are not sufficient in extent or importance to justify a separate color.

Two subtype designations should be sufficient for this type:

29 Waste areqs in timber

29 Waste areas in brush. Small areas not strictly timber or brush should be classed with one of these or with barren, Type 8.

Type No. 8 -- Barren land

This type includes all areas where naturally there is no vegetation. Areas which have been denuded by overgrazing should not be confused with areas naturally barren.

63 Type No. 9 -- Areas of Woodland, supporting grasses, weeds, and browse, singly or in combinations

This type includes all areas, except waste, in the woodland timber type. The main timber species of this type are, by districts, as follows: D-1, Juniper; D-2, pinon-juniper; D-3. pinon-juniper, oak, mesquite; D-4, pinon-juniper oak. D-5, pinon-juniper, juniper, oak, digger pine; D-6 , juniper, oak. These are given as a

guide in typing the range. The character of the range in this type both as regards location, carrying capacity, and management, is sufficiently distinct from the main type in conifer timber to justify a separate type color. The forage may vary from a pure stand of grasses, weeds, or browse to a combination of any two or all. This variation can best be shown by the subtype designations as suggested under "Types and Legend," "General."

72 Type No. 10 -- Range in Aspen

This type includes all range in aspen timber, where the aspen predominates to an extent which does not justify classifying the area under Type 6. Subtypes for this main type will vary as in the other types according to the combination of grasses, weeds, and browse and the proportin of individual species. Subtype designations, here as in the other types, should be decided upon as suggested under "Types and Legend," "General."

The dividing line between the different types and subtypes should be shown by a dotted or broken line in black.

Designations for Vegetation on Types and Subtypes

Grasses

Designation	Common name
Ar.	Aristida (3-awn grasses)
Bs.	Blue stem
Bn.	Bunch grass
Dr.	Deer grass
Fg.	Feather grass
Ga.	Galleta grass
Gm.	Grama grass
Gr.	Grass
M.Bn.	Mountain bunch grass
Pg.	Pine grass
So.	Side oats
Sp.	Sporobolus grass

Grass-like Plants

Eg.	Elk grass
P.Se.	Pine sedge
Se.	Sedge

Weeds

An.	Annuals (grass & weeds)
Arn.	Arnica
Bl.	Blue loco
Cl.	Clover

Weeds (Continued)

Designation	Common name
Dk.	Dock
Fw.	Fireweed
Ge.	Geranium
He.	Hellebore
Ir.	Iris
Lk.	Larkspur
Lp.	Lupine
Mk.	Monkshood
Nh.	Nigger head
On.	Onion
Pv.	Pea vine
Pn.	Pingue
Rb.	Rabbit bush
Rg.	Ragweed
Rw.	Resin weed
Rl.	Rattle pod loco
Sf.	Sunflower
Sw.	Snakk weed
Wd.	Weeds
Yr.	Yarrow

Browse

Al.	Alder
Ap.	Apache plume
Bi.	Birch

Browse (Continued)

Designation	Common name
Br.	Browse
Bb.	Buckbrush
Ch.	Chaparral
Cc.	Choke cherry
Cr.	Currant
Eb.	Elder berry
Fls.	Feather-leaf shrub
Fb.	Fly bush
Gb.	Goose berry
Jb.	Juniper berry
Lt.	Labrador tea
LHb.	Large huckleberry
Mz.	Manzanita
Mh.	Mountain heath
Mm.	Mountain mahogany
Mb.	Myrtle brush
Qb.	Quinine bush
Sg.	Sage brush
Sb.	Service berry
SHb.	Small huckleberry
Snb.	Snow berry
Spr.	Spiraea

Browse (Continued)

Designation	Common name
Tb.	Twin berry
Ws.	Wafer sage
Wc.	Wild cherry
S.	Willow
Yb.	Yellow bush

Trees

To represent tree species the Alpha-Numeric symbols given in "Signs, Symbols & Colors" issued in 1912, should be used, both in the field and on finished maps.

The above designations should not be departed from except when it is necessary to represent species or combinations other than those listed. The man in charge of the work should then decide upon a designation composed of an initial capital letter and such small letter or letters as may be necessary so as not to be confused with those above adopted.

Conditions of the Range

It is desirable to have the map show the range which may be considered as well stocked with vegetation of value for forage; the areas poorly stocked with vegetation of actual value for forage; the areas not overgrazed and the areas overgrazed. No hard or fast line can be drawn which will satisfactorily show the variation either in density or condition, but

a division line arbitrarily chosen will help in deciding the range value from the map alone.

All areas having a density of 3/10 or over of vegetaion actually of value for forage are classified as well stocked and should be represented by the solid color representing the type to which the area in question belongs.

All areas having a density of less than 3/10 of vegetation actually valuable for forage are classified as poorly stocked and should be represented by vertical hatching in the type color, over the white background.

Overgrazed areas should be represented by horizontal hatching in the type color, over the white background. When the range improves the color can be filled in.

Crayon No.

46 Weed range well stocked with herbaceous or shrub vegetation of value for forage, and not overgrazed.

46 Weed range <u>poorly stocked</u> with herbaceous or shrub vegetation of value for forage.

46 Weed range overgrazed.

<u>Water</u>

On many areas the varying capacity of the range and its economic utilization are very much dependent upon the

number and distribution of stock-watering places. For this reason it is very essential to have a knowledge of the available water resources as well as the need and possibility of water development in order to secure proper distribution of stock on the range as well as full utilization of all grazing lands. The water facilities should be represented on the map as follows:

Crayon No.

58 Running water, continuous flow.

58 Running water, intermittent flow.

58 Spring which either naturally or as a result of development affords an adequate watering place for the class of stock grazing on the range.

58 Spring or seeps not sufficiently developed to afford an adequate watering place for the class of stock grazing the range.

58 Dam used for storing water for stock.

58 Permanent Lake.

58 Artesian flow well

58 Well where water is pumped for stock.

Where any watering place is known by a name, the name should be given on the map if practicalbe.

Final Compilation

Maps

Final Map.--The final map should be compiled under the direction of the man who had charge of the party doing the field work. It should be on a scale of one inch to the mile and could show, with as much accuracy as is consistent with econom and the purpose of the grazing survey, the following data:

1. Topography by contours of 100-foot interval.

2. Drainage.

3. Area and location of each type and subtype of grazing land ten acres or larger in area. Prominent features down to five acres, as discussed under mapping in field. This includes all administrative sites.

4. The condition of each area,--whether well-stocked with vegetation or poorly stocked with vegetation, and whether overgrazed or not. The definition of "poorly stocked," as given under types and legend, should be followed.

5. The areas valuable for grazing and areas of no value for grazing.

6. All water facilities, showing kind and state of development.

7. Timber species by Alpha-numeric symbols.

8. Fences, roads, trails, telephone lines, corrals, houses, lookout stations, etc.

9. Boundaries of all alienated lands, but not type classification unless so decided upon for the specific forest in question.

10. Where base maps showing topography, drainage, and cultural features are prepared, for general use, in addition to the Grazing type map, such maps should

show all of the data under 1, 2, 6, 8. In addition they should show boundaries of alienated lands in very light lines. Where requested by the District Forester concerned, or by the Branch of Silviculture, the boundary lines between untimbered grazing lands, timbered lands, brush lands, and barren lands, will be shown by inconspicuous green lines and letters to designate whether park, timberland, etc.

Section Plats, Form 765.--The section plat maps, Form 765, should be planimetered to determine the acreage of each type and subtype on the section. The figures showing acreage should be written in red ink within the boundaries of each type on the face of the map. The scientific names of the principal forage plants should be written on the form as provided. After the data included in the form have been compiled into the final map and report, the completed set for the Forest should be filed by townships and range in the Supervisor's office. They represent the most detailed notes and map of each small area and should be of value constantly for reference in cases where the one-inch scale map and the final report are too general.

Report

In addition to the final map and section plats, Form 765, the data from the reconnaissance should be compiled into a report showing:

1. Acreage
    a. Total--forest, alienated.
    b. By types.
    c. Valuable for grazing and waste or barren.

d. Acreage palatable vegetation, nonpalatable vegetation including waste; no vegetation.

2. General description of each type:

a. Distribution--large or small areas; range in altitude; slope.

b. Soil; moisture; growing season.

c. Vegetation--about average density, species.

d. Agricultural possibilities in brief.

e. General grazing value as compared with other types.

f. Class of stock to which best adapted.

g. Seasons of grazing based upon requirements of vegetation.

h. Grazing management.

3. Discussion of the range by each existing allotment:

a. Acreage--total, by types, and total acreage palatable forage available for stock (using an acre to mean an acre having complete ground cover 10/10 density of palatable vegetation possible of use.)

b. Class of stock and number allotment can carry, or change in class of stock.

c. Existing seasons of grazing; suggested changes.

d. Management; Changes, adoption of deferred grazing, etc.

e. Fences, water development and other improvements necessary in order to adopt recommended management.

f. Changes in allotment boundaries.

4. Improvements suggested:

1. Water development.

2. Fences.

3. Stock trails.

4. Eradication of poisonous plants.

5. Extermination of range-destroying rodents.

5. Studies suggested, with reasons in detail.

6. Suggestions for future work in order to develop final workong plan for grazing.

7. Any other facts which the examiner feels should be presented to the Supervisor. After going over each section of the entire Forest the examiner may see opportunities for improving trail systems, or roads, etc.

In compiling reports approximately according to the above outline, from intensive reconnaissance already done it has been found advisable to first compile township sheets showing for each individual section;

1. Total acreage of each type.

2. Acreage of palatable vegetation; nonpalatable vegetation; no vegetation for each type.

3. Total.

The sheets thus prepared can be used in the nature of a traverse table to find data on individual types for a section, township, or forest, after they have served their purpose in compiling the report by forest, types, and allotments.

Herbarium

As a supplement to the maps and report the collection of plants for the forest should be identified, mounted, classified, and filed in the Supervisor's office in accordance with the instructions of 1912, and for each specimen there should be an individual card in the card index in accordance with the instructions and plan above referred to, copy of which should be on file in each District and Supervisor's office.

Comment

The foregoing outline is prepared in full as instructions for intensive range reconnaissance. The general plan of survey, field examination, types and legend, however, are meant also as general instructions for guidance of local forest officers where they undertake intensive reconnaissance. Any depeature, therefore, from the system of types and legend given should be approved by the Forester. The remainder of the outline should be followed as closely as the qualitications of the man doing the work will permit.

(Signed) A. F. POTTER,
Associate Forester.